WHAT IS CLAIMED AS NEW AND IS DESIRED TO BE SECURED BY LETTER PATENT OF THE UNITED STATES IS:

1. A scanning image formation optical system for use in an optical scanner for scanning a scanned surface for one or more scanning lines by causing one or more coupled luminous fluxes from a light source to be incident on a deflecting reflective surface of a rotating optical deflector, which rotates around a rotary axis of the optical deflector, said rotary axis being parallel to the deflecting reflective surface, diagonally deflecting the luminous fluxes relative to a surface perpendicular to the rotary axis of the optical deflector, and converging the deflected luminous fluxes toward the scanned surface by the scanning image formation optical system so as to form an optical spot on the scanned surface,

the scanning image forming optical system comprising two or more special tilt surfaces, each said tilt surface formed such that a tilt amount of a sub-scanning cross-sectional configuration changes in a main scanning direction.

2. The scanning image formation optical system according to Claim 1,

wherein the two or more special tilt surfaces are formed so as to correct a scanning line curvature and a wavefront aberration on the scanned surface.

3. The scanning image formation optical system according to Claim 1,

wherein the scanning image formation optical system includes two or more optical elements, and

wherein at least two of the two or more special tilt surfaces are formed on different optical elements of the two or more optical elements.

4. The scanning image forming optical system according to Claim 3,

wherein each of the two or more optical elements is a lens.

5. The scanning image forming apparatus according to Claim 3,

wherein the two or more optical elements include one or more lenses and a reflecting mirror having one or more reflecting surfaces, and

wherein at least one of the two or more special tilt surfaces is formed on the reflecting mirror.

6. The scanning image formation optical system according to Claim 1,

wherein the scanning image formation optical system includes two lenses, and

wherein a first of the two or more special tilt surfaces is formed on a surface of a first lens of the two lenses located at a side of the optical deflector and a second of the two or more special tilt surfaces is formed on an emitting surface of a second lens of the two lenses at a side of the scanned surface.

7. The scanning image formation optical system according to Claim 6,

wherein the surface of the first lens located at the optical deflector side, in which the first of the two or more special tilt surfaces is formed, is an emitting surface of the first lens located at the optical deflector side.

8. The scanning image formation optical system according to Claim 1,

wherein the scanning image formation optical system is an anamorphic optical system having a geometrically conjugate relation in a sub-scanning direction between a vicinity of the deflecting reflective surface of the optical deflector and a position of the scanned surface.

9. The scanning image formation optical system according to Claim 8,

wherein a shape in a main scanning cross-section of one or more lens surfaces of the anamorphic optical system is non-arcuate.

10. The scanning image formation optical system according to Claim 8,

wherein a center of paraxial curvature in a sub-scanning cross-section on one or more lens surfaces of the anamorphic optical system draws a curved line in the main scanning direction.

11. The scanning image formation optical system according to Claim 8,

wherein a shape in a sub-scanning cross-section of one or more lens surfaces of the anamorphic optical system is non-arcuate.

12. An optical scanner for scanning a scanned surface for one or more scanning lines, comprising:

a light source configured to emit one or more luminous fluxes;

a coupling device;

a rotating optical deflector having a deflecting reflective surface and a rotary axis parallel to the deflecting reflective surface and configured to rotate the deflecting reflective surface around the rotary axis, wherein the one or more luminous fluxes from the light source, coupled by the coupling device, is incident on the deflecting reflective surface of the optical deflector, diagonally relative to a surface perpendicular to the rotary axis of the optical deflector; and

a scanning image formation optical system configured to converge the deflected luminous fluxes toward the scanned surface to form an optical spot on the scanned surface and to scan the scanned surface with the optical spot, the scanning image forming optical system including two or more special tilt surfaces, each said tilt surface formed such that a tilt amount of a sub-scanning cross-sectional configuration changes in a main scanning direction.

13. The optical scanner according to Claim 12,

wherein the two or more special tilt surfaces of the scanning image forming optical system are formed to correct a scanning line curvature and a wavefront aberration on the scanned surface of the optical scanner.

14. The optical scanner according to Claim 12,

wherein the scanning image formation optical system includes two or more optical elements, and

wherein at least two special tilt surfaces of the two or more special tilt surfaces are formed on different optical elements of the two or more optical elements.

15. The optical scanner according to Claim 14,

wherein each of the two or more optical elements is a lens.

16. The optical scanner according to Claim 14,

wherein the two or more optical elements include one or more lenses and a reflecting mirror having one or more reflecting surfaces, and

wherein at least one of the two or more special tilt surfaces is formed on the reflecting mirror.

17. The optical scanner according to Claim 12,

wherein the scanning image formation optical system includes two lenses, and

wherein a first of the two or more special tilt surfaces is formed on a surface of a first lens located at a side of the optical deflector, and a second of the two or more special tilt surfaces is formed on an emitting surface of a second lens at a side of the scanned surface.

18. The optical scanner according to Claim 17,

wherein the surface of the first lens located at the optical deflector side, in which the first of the two or more special tilt surfaces is formed, is an emitting surface of the first lens located at the optical deflector side.

19. The optical scanner according to Claim 12,

wherein the scanning image formation optical system is an anamorphic optical system having a geometrically conjugate relation in a sub-scanning direction between a vicinity of the deflecting reflective surface of the optical deflector and a position of the scanned surface.

20. The optical scanner according to Claim 19,

wherein the one or more luminous fluxes incident on the deflecting reflective surface of the optical deflector is formed into a line image long in the main scanning direction in the vicinity of the deflecting reflective surface of the optical deflector.

21. The optical scanner according to Claim 20,

wherein a shape in a main scanning cross-section of one or more lens surfaces of the anamorphic optical system is non-arcuate.

22. The optical scanner according to Claim 20,

wherein a center of paraxial curvature in a sub-scanning cross-section on one or more lens surfaces of the anamorphic optical system draws a curved line in the main scanning direction.

23. The optical scanner according to Claim 20,

wherein a shape in a sub-scanning cross-section of one or more lens surfaces of the anamorphic optical system is non-arcuate.

24. The optical scanner according to Claim 20,

wherein plural luminous fluxes of the one or more luminous fluxes are incident on the

deflecting reflective surface of the optical deflector, and

wherein the anamorphic optical system satisfies a following condition:

$$0.9<|\beta_h/\beta_0|<1.1, \qquad (1)$$

where β_0 is a lateral magnification in the sub-scanning direction to an image height 0 and β_h is a lateral magnification at an arbitrary image height h.

25. The optical scanner according to Claim 24,

wherein the luminous fluxes from the light source incident on the deflecting reflective surface of the optical deflector are directed toward the rotary axis of the optical deflector.

26. The optical scanner according to Claim 24,

wherein the optical deflector is a rotary polygon mirror.

27. The optical scanner according to Claim 26,

wherein a length of the deflecting reflective surface of the optical deflector in the main scanning direction is smaller than a diameter in the main scanning direction of each luminous flux incident on the deflecting reflective surface.

28. The optical scanner according to Claim 12,

wherein a single luminous flux of the one or more luminous fluxes is incident on the deflecting reflective surface of the optical deflector.

29. The optical scanner according to Claim 28,

wherein the luminous flux from the light source incident on the deflecting reflective surface of the optical deflector is directed toward the rotary axis of the optical deflector.

30. The optical scanner according to Claim 24,

wherein the optical deflector is a rotary polygon mirror.

31. The optical scanner according to Claim 30,

wherein a length of the deflecting reflective surface of the optical deflector in the main scanning direction is smaller than a diameter in the main scanning direction of the luminous flux incident on the deflective reflective surface.

32. The optical scanner according to Claim 12,

wherein plural luminous fluxes of the one or more luminous fluxes are incident on the deflecting reflective surface of the optical deflector.

33. The optical scanner according to Claim 32,

wherein the plural luminous fluxes from the light source incident on the deflecting reflective surface of the optical deflector are directed toward the rotary axis of the optical deflector.

34. The optical scanner according to Claim 32,

wherein the optical deflector is a rotary polygon mirror.

35. The optical scanner according to Claim 34,

wherein a length of the deflecting reflective surface of the optical deflector in the main scanning direction is smaller than a diameter in the main scanning direction of each of the plural luminous fluxes incident on the deflecting reflective surface.

36. An image forming apparatus, comprising:

a photosensitive medium; and

an optical scanner configured to scan a scanned surface of the photosensitive medium for one or more scanning lines to form a latent image on the photosensitive medium, the optical scanner including:

a light source configured to emit one or more luminous fluxes;

a coupling device; and

a rotating optical deflector having a deflecting reflective surface and a rotary axis parallel to the deflecting reflective surface and configured to rotate the deflecting reflective surface around the rotary axis, wherein the one or more luminous fluxes from the light source, coupled by the coupling device, are incident on the deflecting reflective surface of the optical deflector, diagonally relative to a surface perpendicular to the rotary axis of the optical deflector;

a scanning image formation optical system configured to converge the deflected luminous fluxes toward the scanned surface to form an optical spot on the scanned surface and to scan the scanned surface with the optical spot, the scanning image forming optical

system including two or more special tilt surfaces, each said tilt surface formed such that a tilt amount of a sub-scanning cross-sectional configuration changes in a main scanning direction.

37. The image forming apparatus according to Claim 36,

wherein the two or more special tilt surfaces of the scanning image forming optical system are formed to correct a scanning line curvature and a wavefront aberration on the scanned surface.

38. The image forming apparatus according to Claim 36,

wherein the scanning image formation optical system includes two or more optical elements, and

wherein at least two special tilt surfaces of the two or more special tilt surfaces are formed on different optical elements of the two or more optical elements.

39. The image forming apparatus according to Claim 38,

wherein each of the two or more optical elements is a lens.

40. The image forming apparatus according to Claim 38,

wherein the two or more optical elements include one or more lenses and a reflecting mirror having one or more reflecting surfaces, and

wherein at least one of the two or more special tilt surfaces is formed on the reflecting mirror.

41. The image forming apparatus according to Claim 36,

wherein the scanning image formation optical system includes two lenses, and

wherein a first of the two or more special tilt surfaces is formed on a surface of a first lens of the two lenses located at a side of the optical deflector, and a second of the two or more special tilt surfaces is formed on an emitting surface of a second lens of the two lenses at a side of the scanned surface.

42. The image forming apparatus according to Claim 41,

wherein the surface of the first lens located at the optical deflector side, in which the first of the two or more special tilt surfaces is formed, is an emitting surface of the first lens located at the optical deflector side.

43. The image forming apparatus according to Claim 36,

wherein the scanning image formation optical system is an anamorphic optical system having a geometrically conjugate relation in a sub-scanning direction between a vicinity of the deflecting reflective surface of the optical deflector and a position of the scanned surface.

44. The image forming apparatus according to Claim 43,

wherein the one or more luminous fluxes incident on the deflecting reflective surface of the optical deflector is formed into a line image long in the main scanning direction in the vicinity of the deflecting reflective surface of the optical deflector.

45. The image forming apparatus according to Claim 44,

wherein a shape in a main scanning cross-section of one or more lens surfaces of the anamorphic optical system is non-arcuate.

46. The image forming apparatus according to Claim 44,

wherein a center of paraxial curvature in a sub-scanning cross-section on one or more lens surfaces of the anamorphic optical system draws a curved line in the main scanning direction.

47. The image forming apparatus according to Claim 44,

wherein a shape in a sub-scanning cross-section of one or more lens surfaces of the anamorphic optical system is non-arcuate.

48. The image forming apparatus according to Claim 43,

wherein plural luminous fluxes of the one or more luminous fluxes are incident on the deflecting reflective surface of the optical deflector, and

wherein the anamorphic optical system satisfies a following condition:

$$0.9<|\beta_h/\beta_0|<1.1, \qquad (1)$$

where β_0 is a lateral magnification in the sub-scanning direction to an image height 0 and β_h is a lateral magnification at an arbitrary image height h.

49. The image forming apparatus according to Claim 48,

wherein the luminous fluxes from the light source incident on the deflecting reflective surface of the optical deflector are directed toward the rotary axis of the optical deflector.

50. The image forming apparatus according to Claim 48,

wherein the optical deflector is a rotary polygon mirror.

51. The image forming apparatus according to Claim 50,

wherein a length of the deflecting reflective surface of the optical deflector in the main scanning direction is smaller than a diameter in the main scanning direction of each of the plural luminous fluxes incident on the deflecting reflective surface.

52. The image forming apparatus according to Claim 36,

wherein only a single luminous flux of the one or more luminous fluxes is incident on the deflecting reflective surface of the optical deflector.

53. The image forming apparatus according to Claim 52,

wherein the single luminous flux from the light source incident on the deflecting reflective surface of the optical deflector is directed toward the rotary axis of the optical deflector.

54. The image forming apparatus according to Claim 52,

wherein the optical deflector is a rotary polygon mirror.

55. The image forming apparatus according to Claim 54,

wherein a length of the deflecting reflective surface of the optical deflector in the main scanning direction is smaller than a diameter in the main scanning direction of the luminous flux incident on the deflecting reflective surface.

56. The image forming apparatus according to Claim 36,

wherein plural luminous fluxes of the one or more luminous fluxes are incident on the deflecting reflective surface of the optical deflector.

57. The image forming apparatus according to Claim 56,

wherein the optical deflector is a rotary polygon mirror.

58. The image forming apparatus according to Claim 57,

wherein a length of the deflecting reflective surface of the optical deflector in the main scanning direction is smaller than a diameter in the main scanning direction of each of the plural luminous fluxes incident on the deflecting reflective surface.

59. The image forming apparatus according to Claim 56,

wherein the plural luminous fluxes from the light source incident on the deflecting reflective surface of the optical deflector are directed toward the rotary axis of the optical deflector.

60. The image forming apparatus according to Claim 36,

wherein the latent image formed on the photosensitive medium is visualized.

61. The image forming apparatus according to Claim 60,

wherein the photosensitive medium is a photoconductive member, and

wherein the latent image is visualized by toner into a toner image.

62. The image forming apparatus according to Claim 61,

wherein the toner image is transferred to a sheet-like recording medium.